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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SHEVIN, MARK L

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,607	Applicant(s) ISHIKAWA ET AL.	
	Examiner Mark L. Shevin	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 1-5, filed in Applicant's response on February 19th, 2008, are currently under examination, and claims 1-3 were amended.

In the previous Office Action, mailed November 14th, 2007, claims 1-5, filed April 29th, 2005, were examined on the merits.

Status of Previous Rejections

2. The previous rejection of claims 1-3 under 35 U.S.C. 112, second paragraph, in the Office action dated November 14th, 2007 have been withdrawn in view of Applicant's amendments to claims 1-3 defining the depth of the crystal grains.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. The previous rejection of claims 1-2 under 35 U.S.C. 112, second paragraph, in the Office action dated November 14th, 2007 have been withdrawn in view of Applicant's amendments to claims 1-2 defining the thickness 't'. The introductory paragraph has been reproduced below:

4. The previous rejection of claims 1-5 under 35 U.S.C. 103(a) in view of **Statnikov** (US 6,338,765) in the Office action dated November 14th, 2007 have been maintained for the same reasons as stated in the previous Office Action.

With respect to the amendments of claims 1-3, these amendments merely remove the ambiguity with respect to the depth of the treatment and the depth of the crystal grains affected and thus do not change the scope of the claims as

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previously construed by the Examiner in the manner of broadest reasonable interpretation.

Response to Applicant's Arguments:

5. Applicant's arguments filed February 19th, 2008 have been fully considered but they are not persuasive:

Applicant first asserts that '765 does not disclose or suggest that the "average of longitudinal axis of crystal grains at a depth of at least 2mm from the surface of the steel plate in the microstructure adjacent to the fusion line (FL) of a weld metal and a steel plate matrix in said heat affected zone" is "equivalent to the crystal grain size of the steel plate matrix before welding at a depth of $\frac{1}{4}$ of the thickness t from the surface of the steel plate".

Applicant's second assertion (B) is that "there is no disclosure or suggestion of a rearrangement of the microstructure and an improvement of the toughness of heat affected zone in a multi-layer welded joint.

Applicant's third assertion is that the "765 patent does not disclose or suggest anything about an improvement of toughness by the above mentioned feature of the present invention."

Applicant's fourth assertion is that regarding instant claim 4, '765 does not make the length of the weld undercut 0.3 mm or less.

With respect to Applicant's first assertion, '765 uses ultrasonic impact treatment to improve the grain structure and the residual stress patterns in the welded material (col. 5, lines 52-62) with the explicit objective being "to produce longer wear and increased load bearing capacity." The grain structure is

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modified as explained again at col. 6, lines 59-67. The internal microstructure of the product is reworked to relax and redistribute residual structural stress patterns caused by welding in the vicinity of weld seams (col. 8, lines 1-20). It is clear then that '765 is having a profound beneficial effect on the mechanical properties of the welded parts that are treated by the method of the patent and this is a result of change in microstructure. From MPEP 2112, para. V, subpara 1: "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. 102, on '*prima facie* obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same..."

With respect to Applicant's second assertion, Statnikov does teach a rearrangement of microstructure in that his ultrasonic impact technique (UIT) "creates a rearrangement submicrostructure of grains in treated area, particularly in ferromagnetic metals" (col. 10, lines 45-57, claims 11-13, 34, and 36). Both the instant claim 1 and Statnikov have the same positive step of subjecting a welded joint to ultrasonic impact. The ultrasonic impact treatment of '765 relaxes residual stress and internally restructures crystal structure in terms of grain size (col. 1, lines 51-54).

With respect to Applicant's third assertion, '765 need not mention the improvement of toughness to render the instant claims obvious as it is clear from '765 as explained above that the mechanical properties are greatly improvement and weld defects repaired by the use of UIT. Applicant devotes a paragraph to

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explaining the differences between toughness and fatigue but the fact that toughness is different from fatigue does not mean that one of ordinary skill would not look to an improvement in fatigue strength as also benefiting toughness. Both toughness and fatigue are diminished by the presence of voids, cracks, and particularly surface defects that serve as geometric stress risers. Indeed one of the basic tests of toughness relies on a large pre-machined 'V'-shaped notch in the material to serve as a crack initiation point. As the UIT technique of '765 teaches the removal of voids and repair of cracked surfaces (col. 10, lines 20-40) one would thus have a reasonable expectation of success in that such a method of closing cracks and generating compressive stresses that close cracks and prevents crack formation and propagation would increase toughness.

With respect to Applicant's fourth assertion, '765 teaches that the method of his invention may be employed to repair cracked surfaces (col. 10, lines 30-35). Deep cracks may be similarly repaired by re-welding and UIT treatment (col. 11, lines 9-10). Plastic deformation of a treated body work surface and its internal body volume of up to 3 mm in steel (col. 6, lines 25-30) would be expected to close such undercuts in welded areas that serve as stress risers. Internal plastic deformation is often seen (col. 6, lines 62-64). Furthermore, one of ordinary skill would recognize that reducing the size of such undercut cracks as important in maximizing mechanical properties such as fatigue and toughness as '765 teaches the repair of shallower cracks and defects are affected by UIT treatment to these defects and adjacent areas (col. 11, lines 10-15) with the goal being to prevent crack formation (col. 11, lines 18-20).

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Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

-- Claims 1-5 are finally rejected

-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/

Examiner, Art Unit 1793

/Roy King/

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Supervisory Patent Examiner, Art Unit 1793

April 11th, 2008
10-533,607